

and decelerating, said flywheel. No motor/generator means is provided, nor any flywheel.

Henry does not teach use of wire metal mesh spring dampers between portions of the rolling element bearings and the bearing housings. Instead, Henry shows use of leaf springs and a continuous wave spring washer. Henry's leaf springs and continuous spring washer would provide much lower damping, be much more susceptible to fatigue and would have lower impact capability before becoming permanently damaged, all problems sought to be overcome by the disclosed invention. Further, gas turbine engines are not likely subjected to the extreme number of cycles expected of flywheel systems from continuous operation for many years at high speed and hence do not have the same stringent cycle life requirements as the disclosed flywheel system.

Thus, Henry does not disclose the combination claimed in the rejected claims 1, 2, 4-9, 11 and 12. Henry's leaf springs 35 and wave spring 36 are not metal mesh dampers as defined in Applicants specification. Words have meaning. It is not appropriate to call an element in a reference something that clearly is not, and then use the misnamed element as an indication that the claimed element is old in the combination. Applicant believes that claims 1, 2, 4-9, 11 and 12 are patentable over Henry et al.

Claim 3 has been rejected under 35 USC 103 as obvious over Henry in view of Baermann. Baermann teaches a passive magnetic bearing for a vertical axis electricity meter. The examiner asserts that bearings for gas turbine engines and bearings for electricity meters are the "same field of endeavor". Applicant traverses this assertion by the Examiner and believes that there could hardly be more different "endeavors" than bearings for gas turbine engines and electricity meters. Electricity meters are on a vertical axis and have virtually no side loads and very little vertical load. Electricity meters have no vertical impulse forces acting transverse to the axis of the rotor like the forces acting on gas turbine engines when the airplane lands or makes changes in pitch, yaw or roll in flight. Applicant believes that the last place a person of ordinary skill in the art, either art, would look when designing a bearing for his gas turbine engine or electricity meter, would be in the art of the other field.

The Examiner asserts that "it would have been obvious at the time the invention was made to include in said magnetic bearing rare earth magnets to provide lifting force as taught by Baermann". Applicant does not understand what the Examiner has in mind. Henry is a horizontal axis machine. How does the Examiner propose to use Baermann's magnetic thrust bearing to provide "lifting force" in a horizontal axis gas turbine engine? Clarification is respectfully requested.

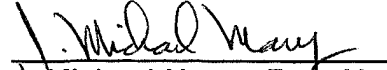
Claim 10 has been rejected under 35 USC 103 as unpatentable over Henry in view of Morreale. Morreale teaches use of urethane elastomers to reduce vibrations and noise generated in an electric motor. It does not teach the use of flexible bearing mounts for reduction of the rigid body criticals of a flywheel energy storage system. The use of elastomers instead of wire metal mesh as disclosed in the invention is outside the scope of claim 10, and would not work in the combination set forth in claim 10. The elastomers would overheat very rapidly at the high operating speeds of flywheel energy storage systems, and also in the high temperature environment of a gas turbine engine. Moreover, they would outgas and become degraded in the flywheel vacuum container, they would degrade the vacuum in the container and thereby reduce its operating life, and they could not handle even a small fraction of the cycle life of wire metal mesh dampers. Since the electric motors and the elastomer dampers of Morreale is not in the same field of endeavor as the gas turbine engines of Henry, Applicant does not believe a person of ordinary skill in the art would look to art in the other field for teachings in making new designs in his own field.

The Examiner asserts that Morreale shows the rolling element bearing being lubricated using a dry lubricant. Applicant does not find a disclosure of dry bearing lubricants in Morreale. There is a reference to "grease lubricants" on line 14 of col. 4, but not dry lubricants. Even if there were a reference to dry lubricants in Morreale or Henry, Applicant does not believe that such a disclosure would have any relevance to his bearing system for use for a flywheel system spinning over long periods of time in an evacuated chamber. The purpose and function of the lubrication is different in the different systems. Accordingly, Applicant believes that claim 10 is patentable over the combination of Henry and Morreale.

Applicant believes that all issues pertaining to patentability have now been answered and that this application is now in condition for allowance. If the Examiner concurs, he is respectfully requested to pass this application to issue.

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Respectfully submitted,

A handwritten signature in dark ink, appearing to read "J. Michael Neary", is written over a horizontal line.

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Appendix Showing Changes to the Abstract

A combination mechanical and magnetic support system for a flywheel power supply for storing and retrieving energy in which said power supply includes a flywheel that spins about an axis of rotation inside an evacuated chamber, and an attached motor/generator for accelerating and decelerating the flywheel for storing and retrieving the energy. One or more rolling element bearings and at least one magnetic bearing are mounted in bearing housings attached to the chamber for providing radial and axial support for the flywheel in the chamber. A wire metal mesh spring damper between portions of the rolling element bearings and the bearing housings provide both radial damping and radial centering stiffness to the [flywheel] wheel. The support system has a radial stiffness that allows a cylindrical rigid body resonance of said flywheel to occur at a speed less 30% of the normal operating speed. The magnetic bearings support at least than 80% of the weight of the flywheel, thereby substantially extending the life the of the rolling element bearings.